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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,533	08/05/2003	David M. Carson	87334.5700	6462

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EXAMINER	
MILLER, PATRICK L	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,533	CARSON ET AL.	
	Examiner	Art Unit	
	Patrick Miller	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-15,24 and 25 is/are rejected.

7)☒ Claim(s) 16-23 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 05 August 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the abstract is not sufficiently descriptive. Correction is required. See MPEP § 608.01(b).

   - Applicant is reminded of the proper language and format for an abstract of the disclosure.

   The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

   The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

2. Claims 10-14 and 16-23 are objected to because of the following informalities: See bullets below. Appropriate correction is required.

   - With respect to claim 10, it is unclear what the difference is between *measuring* the local temperature and *sensing* a local temperature cited in claim 9. Please clarify.
   - Claim 11 recites, "the calculated temperature of the rotor magnets." Lack of antecedent basis for this term.
   - Claim 16 recites, "to calculate a temperature of the rotor magnets" (line 8), and claim 21 recites, "determining an actual temperature Tm" (line 5). It is unclear whether these two temperatures are the same. Please clarify.
   - Claim 21 recites, corresponding local temperatures, Ts1 and Ts2. Both of these variables are not defined (claim only defines Ts). Also, claim 21 states that Ts1 and Ts2 are

locations inside the motor, while the claim later defines Ts as "subsequently sensed," which implies time dependence. Please clarify.

- Claim 22 recites, "a determined temperature of the rotor magnets, Tm" (line 4). Tm is initially defined in claim 21 as "an actual temperature of the rotor magnets" (line 5 of claim 21). Please make consistent. Additionally, change "a" to "the."
- Claim 22 does not define every variable in the equation. Furthermore, $\tau_{remaining}$ is not in the equation.
- Claim 22 defines the maximum torque constant of the motor, k_t, with respect to 20 degrees Celsius. Claim 23 then defines this function as a temperature other than 20 degrees. Since the temperature is defined in claim 22, and claim 23 depends from 22, the temperature cannot be changed. The Examiner suggests making temperature a variable in claim 22 and making separate claims for 20 degrees and temperatures other than 20 degrees.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15, 24, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ishii et al (6,548,981).

- With respect to claims 1, 9, 10, and 24, Ishii et al disclose a system and method for determining the output mechanical torque generated by an electric motor, comprising: a means for sensing a local temperature at, at least one location inside the motor and generating and transmitting a temperature related signal (Fig. 1, #29 transmits signal, S14 in Fig. 11); and a processor that utilizes the temperature signal from the temperature sensor to determine an output mechanical torque generated by the motor (Fig. 11, "box" processes signal S14; col. 19, lines 1-23, processes temperature signal to determine current, which is used to calculate torque in equations 32-39; col. 15, lines 9-59).
- With respect to claim 2, the temperature sensor is mounted on a commutation board (Fig. 1, #29 mounted on a commutation board).
- With respect to claim 3, the temperature is on a circuit board, and therefore is an integrated circuit type (col. 5, lines 1-9).
- With respect to claim 4, an A-D converter is disposed between the temperature sensor and the processor (Fig. 11, #48).

- With respect to claims 5 and 13, since the temperature sensor sends an analog temperature signal to the A-D for conversion to a digital temperature signal, the temperature sensor is an analog type (Fig. 11, signal S14 to #48).
- With respect to claims 6 and 14, the Examiner takes official notice. The motivation to implement a digital temperature sensor is to reduce the number of components in the motor system. This provides the advantage of reducing overall circuit size because of fewer components. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to make the temperature sensor of Ishii et al a digital temperature sensor, thus making the A-D converter (Fig. 11, #48) unnecessary, and providing the advantage of reducing circuit overall size.
- With respect to claims 15 and 25, the temperature of at least one rotor magnet is determined (cols. 18/19, lines 55-67/1-23).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4, 5, 6, 7, 9, 10, 11, 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mutoh et al (5,650,700) in view of Tao (5,612,605) and Bowers et al (6,529,135).

- With respect to claims 1 and 9, Mutoh et al disclose a system and method for determining the output mechanical torque generated by an electric motor, comprising: a means for sensing a local temperature at, at least one location inside the motor (Fig. 5, #41 is located externally, but detects a local temperature *in* (inside) the motor; col. 9, lines 35-41); and a means for calculating the secondary resistance (rotor resistance) based on the detected temperature (col. 9, lines 39-40).
- Mutoh et al do not disclose calculating the output torque based on the sensed temperature and the temperature sensor mounted inside the motor.
- With respect to claims 1 and 9, Tao discloses determining the output mechanical torque based on the rotor resistance (secondary resistance) (col. 9, lines 41-67; Equation 8). Tao goes on to disclose setting the desired torque equal to the determined output torque (cols. 9/10, lines 66-67/1-2). This provides the advantage of calculating the "slip," which can be used to correct external disturbances.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use the calculated resistance, as described by Mutoh et al, to calculate the output mechanical torque, which can be used to calculate the slip, thereby providing the advantage of correcting external disturbances, as taught by Tao.
- With respect to claims 1, 9, and 10, Bowers et al disclose a temperature sensor mounted on the inside of a motor that senses the temperature inside a motor and transmits a temperature signal (Fig. 1, #10e). The motivation to place a temperature sensor inside the motor is to continuously and more accurately monitor (compared to sensor mounted outside) the winding temperature. This provides the advantage of more quickly and accurately determining when the temperature exceeds a predetermined value, and controlling the motor to prevent damage to said motor (cols. 7/8, lines 29-67/1-15).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention change the location of the temperature sensor, from outside the motor to inside the motor, in the system of Mutoh et al, thereby providing the advantages of more quickly and accurately determining the motor temperature, which prevents the motor from being damaged due to excessive temperature, as taught by Bowers et al.
- With respect to claim 4, Bowers et al disclose an A-D converter disposed between the temperature sensor and the processor (Fig. 3, #58 receiving signal from #10e).
- With respect to claims 5 and 13, Bowers et al discloses the A-D converter converting an analog temperature signal into a digital temperature signal (col. 7, lines 39-42).
- With respect to claims 6 and 14, the Examiner takes official notice. The motivation to implement a digital temperature sensor is to reduce the number of components in the

motor system. This provides the advantage of reducing overall circuit size because of fewer components. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to make the temperature sensor of Bowers et al a digital temperature sensor, thus making the A-D converter (Fig. 3, #58) unnecessary, and providing the advantage of reducing circuit overall size.

- With respect to claim 7, Bowers et al disclose the processor housed outside the motor (Fig. 1, #2).
- With respect to claim 11, Bowers et al disclose comparing the measured local temperature to a predetermined response temperature and adjusting an operation of the motor based on a result of the comparison (col. 7, lines 43-58).
- With respect to claims 6 and 14, the Examiner takes official notice. The motivation to use a plurality of temperature sensors to sense the local temperature is to provide the advantage of a more accurate temperature reading, or to monitor a temperature at a specific internal location. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to sense the local temperature in the motor of Mutoh et al, Tao, and Bowers et al, thereby providing the advantage of a more accurate local temperature measurement, or monitoring the temperature at a specific internal location.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mutoh (6,205,405) in view of Tao (5,612,605) and Pouvreau (6,205,405).
   - Mutoh et al disclose a system for determining the output mechanical torque generated by an electric motor, comprising: a means for sensing a local temperature at, at least one

location inside the motor (Fig. 5, #41 is located externally, but detects a local temperature *in* (inside) the motor; col. 9, lines 35-41); and a means for calculating the secondary resistance (rotor resistance) based on the detected temperature (col. 9, lines 39-40).

- Mutoh et al do not disclose the processor communicating with the temperature sensor to determine an output mechanical torque, and a specimen holder connected to a motor shaft.
- Tao discloses determining the output mechanical torque based on the rotor resistance (secondary resistance) (col. 9, lines 41-67; Equation 8). Tao goes on to disclose setting the desired torque equal to the determined output torque (cols. 9/10, lines 66-67/1-2). This provides the advantage of calculating the "slip," which can be used to correct external disturbances.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use the calculated resistance, as described by Mutoh et al, to calculate the output mechanical torque, which can be used to calculate the slip, thereby providing the advantage of correcting external disturbances, as taught by Tao.
- Pouvreau discloses a centrifuge, comprising: an electric motor (Fig. 3, #32 is an asynchronous motor; col. 2, lines 4-6); a motor shaft (Fig. 3, #28 and #30); and a specimen holder connected to the shaft (col. 4, lines 35-37). The motivation to use the asynchronous (induction) motor to control a centrifuge is to provide the advantages of requiring a lower starting current and the capability of varying speed based on the load.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the induction motor system (including asynchronous) of Mutoh et al

could be used to control a centrifuge with a motor shaft and a specimen holder connected to the motor shaft, thereby providing the advantages of requiring a lower starting current and the capability of varying speed based on the load, as taught by Pourveau.

6. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mutoh et al (5,650,700) in view of Tao (5,612,605).

- Mutoh et al disclose a system for determining the output mechanical torque generated by an electric motor, comprising: a means for sensing a local temperature at, at least one location inside the motor (Fig. 5, #41 is located externally, but detects a local temperature *in* (inside) the motor; col. 9, lines 35-41); and a means for calculating the secondary resistance (rotor resistance) based on the detected temperature (col. 9, lines 39-40).
- Mutoh et al do not disclose calculating the output torque based on the sensed temperature.
- Tao discloses determining the output mechanical torque based on the rotor resistance (secondary resistance) (col. 9, lines 41-67; Equation 8). Tao goes on to disclose setting the desired torque equal to the determined output torque (cols. 9/10, lines 66-67/1-2). This provides the advantage of calculating the "slip," which can be used to correct external disturbances.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use the calculated secondary resistance, as described by Mutoh et al, to calculate the output mechanical torque, which can be used to calculate the slip, thereby providing the advantage of correcting external disturbances, as taught by Tao.

Allowable Subject Matter

7. Claims 16-23 are objected to as being dependent upon a rejected base claim, but would be allowable once the minor informalities are corrected and if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

   - With respect to claim 16, the Prior Art does not disclose, in a step of determining the temperature of a rotor magnet, determining an offset between a local temperature inside the motor and the temperature of the rotor magnet and using the offset and a received temperature signal to calculate the *actual* temperature of the rotor magnets.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Miller whose telephone number is 571-272-2070. The examiner can normally be reached on M-F, 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on 571-272-2800 ext 41. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick Miller
Examiner
Art Unit 2837

pm
September 17, 2004

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